www.c-jhs.com

Calabar Journal of Health Sciences

Original Article

Assessment of renal and hepatic function in people that engage in substance abuse among rehabilitation home inmates in Kaduna

Muhammad Mujtaba Abdulrasheed[1], Istifanus Bala Bosan[2], Abubakar Ibrahim[2], Aisha Muhammed Jallo[3], Muhammad Manko[4], Musa Mohammed[5], Kabiru Umar[6]

[1]Department of Medicine, Ahmadu Bello University Teaching Hospital, [2]Department of Medicine, Ahmadu Bello University, [3]Department of Medicine, Barau Dikko Teaching Hospital, [4]Department of Medicine, Ahmadu Bello University Teaching Hospital, Zaria, [5]Department of Immunology, Ahmadu Bello University, [6]Medical Laboratory Science, Ahmadu Bello University, Zaria, Nigeria.

***Corresponding author:**
Muhammad Mujtaba Abdulrasheed,
Department of Medicine,
Ahmadu Bello University Teaching Hospital, Zaria,
Nigeria.

mujtabaabdulrasheed@gmail.com

Received: 17 November 2022
Accepted: 09 March 2023
EPub Ahead of Print: 19 June 2023
Published: 07 August 2023

DOI
10.25259/CJHS_36_2022

Quick Response Code:

ABSTRACT

Objective: Use of psychoactive substances predates civilization and uses is increasing worldwide. The menace of substance abuse in Nigeria especially among adolescents has become an epidemic with its attendance health and social consequences on the society. The study aims to determine the relationship between substances of abuse as direct risk factor for chronic kidney and liver diseases at Rehabilitation home inmates in Kaduna.

Materials and Method: It was cross-sectional study. All Borstal rehabilitation home inmates at Kaduna where administered with questionnaire to assess their biodata, medical history, social history including substance abuse history. They were screened for hepatitis B and C, HIV, liver and renal function. All those that tested positive to the viral HBsAg, HCV Ab and HIV were exempted from further analysis. Data were analyzed using SPSS version 25.0

Results: A total 315 participants were analyzed after excluding those with positive results of HBsAg, HCV and HIV. Of whom 303 (84.6%) were males with a median age = 21.0 ± 13.465. Among the substances consumed Codeine (48.6%) was the most consumed, followed by Tramadol (33.8%). There was a negative correlation between use of substances and eGFR (P = 0.234). Conversely, there was positive correlation between use of substances and ALT (P = 0.063). Cross-tabulation between abuse of substances with eGFR was found to be statistically significant (P = 0.002). However, a similar crosstabulation with ALT was not statistically significant (P = 0.085). Multivariate binary logistic regression analysis shows no relationship between substance abuse and eGFR, but with an odd of 1.419 for ALT >2 times upper limit of normal (P = 0.138).

Conclusion: Substance abuse is prominent among Borstal home inmates and is a potential risk for kidney and liver disease.

Keywords: Renal, Hepatic, Function, Substance abuse, Rehabilitation home inmates

INTRODUCTION

The use of psychoactive substances predates civilization. The use of those substances is increasing worldwide.[1] When a plant part or synthetic agent is used to treat or control diseases, it is referred

to as rational use. However, it is termed drug abuse when used as excessive and persistent self-administration without regard to the medically or culturally accepted patterns.[2] The menace of substance abuse in Nigeria especially among adolescents has become an epidemic. The typical victims used to be males, adults, and urban dwellers, but it has extended to females, adolescents, and rural dwellers.[3]

The victims of drug or substance abuse are often stigmatized by society. Before now, Nigeria like countries of the world was overburdened majorly with tobacco and alcohol. Sadly, now the nation has to cope with abuse and addiction to different substances such as narcotics, cannabis, heroin, amphetamines, sedatives, inhalants, and the like.

Very little budget is allocated to the formal sectors for their rehabilitation. Some of the formal rehabilitation units are found in psychiatric hospitals, Borstal homes, and Nigerian Drug Law Enforcement Agency, NDLEA, rehabilitation units, while the informal rehabilitation centers are traditional and faith-based facilities. Most of these informal centers are not regulated, hence therein a lot of human rights abuse. Unfortunately, the formal sectors cannot cope with the increasing population of victims of substance abuse.

The menace of substance misuse or abuse is commoner among the youths, who are supposedly the future of the nation. The complications of substance abuse are enormous. It is rather multiorgan. It ranges from psychosocial to physical involvement. There are scanty studies on organ complications of substance abuse. Most studies concentrated on psychosocial complications. Kidney and liver complications have received the least attention in Nigeria. Many drug addicts especially intravenous drug users are prone to viral infections like hepatitis B and C, and human immunodeficiency virus (HIV). Infections by these viruses constitute a major cause of the chronic liver disease (CLD) and chronic kidney disease (CKD). Viral hepatitis and HIV mostly cause chronic glomerulonephritis which is the top-ranking cause of CKD in Nigeria.[4] Among the cause of CLD in Nigeria, hepatitis B and C constitute the major cause.[5] Another mechanism of disease caused by the substance of abuse on the liver and kidney is direct toxicity on the organs resulting in toxic-related CLD or chronic tubulointerstitial nephritis. These substances may also result in immunologically induced chronic glomerulonephritis.

The study aims to determine the relationship between substances of abuse as a direct risk factor for CKD and chronic liver disease in Borstal Home, Barnawa, Kaduna.

MATERIAL AND METHODS

Study design

The study was a cross-sectional study. The study population was inmates of Borstal Home of Nigerian Correctional Services. A total of 365 were screened. A multistage sampling technique was used. First, participants were selected through a simple random sampling technique. Subsequent cases were then selected through a systematic sampling technique until the minimum sample size is achieved.

A pre-tested structured mixed open and closed-ended interviewer-administered questionnaire was used to collect appropriate data from the respondents. The questionnaire comprised three parts: demographic data, medical and social history, and investigation results.

Collection of blood samples

Blood samples were collected into plain bottles, allowed to clot, and centrifuged at 3500 rpm for 10 min. The sera were separated, stored at 4°C, and used for evaluation of biochemical parameters which include kidney function test (serum creatinine) and liver function tests (Alanine transaminase, ALT), and serology for hepatitis B and C, and HIV. All those that tested positive were exempted from direct association and correlation with the substances of abuse.

Statistical analysis

Data analysis was done using the Statistical Package for the Social Sciences, version 25.0. Findings were presented as frequencies and percentages in tables and charts. The average was expressed as mean ± standard deviation. The test of statistics was determined using Chi-square which was used to test for qualitative data. Binary logistic regression was used to analyze the predictor variables. The level of significance was assumed to be $P < 0.05$ at 95% Confidence interval.

RESULTS

Sociodemography

There were 365 participants in the study, but only 315 were further analyzed after excluding those with positive results of hepatitis B surface antigen (HBsAg), hepatitis C virus (HCV), and HIV. A total of 361 out of the 365 (96.2%) participating inmates were male. Of these 315 further studied, 303 (84.6%) were male with a mean age = 25.97 ± 13.47. Among the substances consumed, codeine was the most consumed at 48.6% followed by tramadol (33.8%).

Test of association

After the exemption of HBsAg, HCV, and HIV reactive subjects, Pearson's correlation and Chi-square test were found between all substance abuse and the specific commoner substances of abuse with eGFR and ALT, as shown in [Table 1]. There was a negative correlation between the use of substances and eGFR. Conversely, there was

a positive correlation between the use of substances and ALT. However, this relation was not demonstrated to be of statistical significance, $P = 0.234$ and $P = 0.063$, respectively.

The chi-square test of the relationship between abuse of substances with eGFR was found to be statistically significant ($P = 0.002$), as shown in [Table 2]. However, a similar test of association with ALT was not statistically significant ($P = 0.107$), as shown in [Table 3]. Multivariate binary logistic regression analysis is shown in [Table 4]. There was no significant relationship between substance abuse and eGFR and ALT.

Table 1: Correlation between substance abuse, eGFR, and ALT.

Parameter	Substance abuse	eGFR	ALT
Substance abuse			
r^2	1	−0.063	0.098
P		0.234	0.063
eGFR			
r^2	−0.063	1	−0.001
P	0.234		0.984
ALT			
r^2	0.098	−0.001	1
P	0.063	0.984	

eGFR: Estimated glomerular filtration rate, ALT: Alanine transaminase

Table 2: Effect of substance abuse on eGFR among Borstal home inmates Kaduna.

	eGFR (mL/min/1.73 m²)		Test statistics	*P*-value
	<60	≥60		
Substance abuse				
Yes	1	138	Fisher's exact	0.002
No	0	121		
Codeine				
Yes	0	62	Fisher's exact	0.080
No	13	253		
Tramadol				
Yes	0	41	Fisher's exact	0.231
No	13	261		

eGFR: Estimated glomerular filtration rate

DISCUSSION

The policy of Borstal homes is not meant entirely for males, but 361 out of the 365 (96.2%) inmates were male. This might have shown that most of the criteria that qualify individuals were common among the male gender. One of these criteria is drug abuse. Drug abuse is the use of drugs to the extent that interferes with health and social function.[6] The mean age was noted to be 25.97 ± 13.47. Borstal home was designed for the reformation of youths between the age of 16 and 21 years.[7] This shows that there is an older age group on reformation at Borstal home Kaduna. Those engaging in drugs were found to use mostly oral codeine and tramadol. A similar finding was observed at Ogbomosho (Southwestern Nigeria), where tramadol was the most commonest substance of abuse among youths.[8] In the nearest neighboring local government, marijuana was the most common substance of abuse among school adolescents and motorcycle riders.[9,10] Intravenous drugs were not found to be popular among the studied population.

One of the major roles of the kidney is the excretion of drugs and toxins either as a whole or as metabolites. Due to its enormous roles in metabolism, it receives about a quarter of the cardiac output and invariably receives a high dose of toxins per unit of time. If the substance is nephrotoxic, it can overcome the defense system of the kidney either directly or get damaged by hypersensitivity of the immune system. Some of the damages might be indirect through blood-borne infections such as hepatitis B and HIV that might be acquired from intravenous drug abusers.[11] The substances cause a wide spectrum of kidney diseases ranging from acute to CKDs.[11] Although the drugs that are commonly abused at Borstal home Kaduna are not mainly the intravenous route drugs. Despite that those individuals with positive serology to those viruses were excluded from the assessment of the relationship to ensure, they do not serve as confounders. Many substances of abuse can cause kidney damage which might start with structural damage and as disease advances, functional impairment sets in one important assessor of kidney function is glomerular filtration rate and GFR. Estimated GFR denoted by eGFR was used in this study.

Table 3: Effect of substance abuse on ALT among Borstal home inmates Kaduna.

Variable	Responses	ALT		Test statistics	X value	Odd ratio	95% CI	*P*-value
		>40 iu/L	≤40 iu/L					
Substance abuse	Yes	119	5	Chi-square	2.146	2.127	0.759–5.962	0.107
	No	179	16					
Codeine	Yes	60	2	Fisher's exact		2.395	0.543–10.566	0.186
	No	238	19					
Tramadol	Yes	40	3	Fisher's exact		0.930	0.262–3.302	0.558
	No	258	18					

ALT: Alanine transaminase

Table 4: Binary logistics regression analysis between abuse of substance among Borstal home inmates that abuse substance and ALT and eGFR.

Variable	Chi-square	*P*-value	Adjusted odd	95% CI for odd ratio	
				Lower	Upper
eGFR	0.000	0.999	1135727483	0.000	
ALT	2.372	0.124	0.442	0.158	1.247
Constant	0.000	0.998	0.567	0.000	

eGFR: Estimated glomerular filtration rate, ALT: Alanine transaminase

The relationship this study has shown a negative correlation between the use of substance abuse and eGFR, implying that the more one abuse substance the lower the renal function likely from kidney damage. The chi-square test between abuse of substances with eGFR was found to be statistically significant ($P = 0.002$).

The liver on the other hand functions in the detoxification of the drugs and toxins even before it reaches the kidney for final excretion. Some substances may have a direct damaging effect on the liver. Following liver damage, its enzymes are liberated into the system. One of those most specific enzymes to the liver is ALTs. The more damage the higher is the ALT serum level. This study showed a positive correlation between substance abuse and ALT, implying that the more people abuse substances, the higher the chances of liver damage as evident by the rise in ALT. However, this clinical trend was not demonstrated to be statistically significant by the Chi-square test and multivariate binary logistic regression analysis. This statistical relationship might be improved by larger studies.

Limitation

As at admission into Borstal homes, all exposures to these substances are cut off; hence, quantitative toxicology studies were not done. Being a cross-sectional study, longitudinal follow-up of the long-term consequences of these substances was also not done, because Borstal homes have a limited rehabilitation period.

CONCLUSION

Substance abuse is prominent among Borstal home inmates and is a likely risk for kidney and liver disease. Efforts in the prevention of drug abuse should be extensive, given the fact that its consequences go beyond social to include both communicable and non-communicable diseases.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Robinson SM, Adinoff B. The classification of substance use disorders: Historical, contextual, and conceptual considerations. Behav Sci (Basel) 2016;6:2-23.
2. Federal Ministry of Health. National Guidelines for Quantification of Narcotic Medicines. Abuja: Federal Ministry of Health; 2017.
3. Catherine E, Peace N, Harcourt P, Harcourt P. Forms and incidence of drug abuse among Nigerian adolescents. Int J Innov Psychol Soc Dev 2019;7:7-13.
4. Barsoum RS. Chronic kidney disease in the developing world. N Engl J Med 2006;354:997-9.
5. Adekanle O, Ijarotimi O, Obasi E, Grace N, Nwojo A, Ndububa DA. A Southwest Nigerian tertiary hospital 5-year study of the pattern of liver disease admission. Niger J Gastroenterol Hepatol 2020;12:18-23.
6. DO Fareo. Drug abuse among Nigerian adolescents-strategies for counselling. J Int Soc Res 2012;5:341-7.
7. Sarki ZM, Abdullahi A, Mukhtar JI. The role of borstal homes in Nigeria: Reformation or remaking criminality ? J Adv Res Soc Behav Sci J 2018;12:17-23.
8. Idowu A, Aremu AO, Olumide A, Ogunlaja AO. Substance abuse among students in selected secondary schools of an urban community of Oyo-state, South West Nigeria : implication for policy action. Afr Health Sci 2018;18:776-85.
9. Ati-Muazu M, Aliyu AA. Prevalence of psychoactive substance use among commercial motorcyclists and its health and social consequences in Zaria, Nigeria. Ann Afr Med 2008;7:67-71.
10. Idris SH, Sambo MN. Psychoactive substance use among in-school adolescents in Zaria, North Western Nigeria: What are the triggers? Niger J Med 2009;18:291-4.
11. Browne T, Seay KD, Iachini A, Dehart D, Clone S, Pantridge C, *et al*. Substance use disorders and kidney disease . Natl Kidney Found J Nephrol Soc Work 2015;41:9-18.

How to cite this article: Abdulrasheed MM, Bosan IB, Ibrahim A, Jallo AM, Manko M, Mohammed M, *et al*. Assessment of renal and hepatic function in people that engage in substance abuse among rehabilitation home inmates in Kaduna. Calabar J Health Sci 2023;7:35-8.